

UNITED STATES MARINE CORPS  
Basic Officer Course  
The Basic School  
Marine Corps Combat Development Command  
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B2105

**SERVICE RIFLE****PART I: FUNDAMENTALS OF SMALL ARMS AND WEAPONS HANDLING****Student Handout****1. Principles of Small Arms and Small Arms Ammunition**

a. **Definition.** Small arms are defined as weapons which discharge small projectiles over relatively short ranges. Weapons with a caliber of 20 millimeters (.787 inches) or less are classified as small arms.

b. **Caliber.** The diameter of the bore of a weapon. Caliber is sometimes expressed in millimeters (i.e., the M16A2 has a caliber of 5.56 mm) and sometimes expressed in inches (i.e., the M2 machine gun has a caliber of .5 inches).

c. **Categories.** Small arms are also classified into three main categories. These are handguns (commonly referred to as side arms), shoulder weapons and machine guns.

d. **Rifling.** The rifling is the lands and grooves in the barrel that cause the projectile to spin as it goes down range. This increases the accuracy of the rounds.

2. **Cycle of Functioning.** Every small arm has a specific cycle of functioning. This cycle refers to the actions that occur each time a round is fired. The sequence or manner of accomplishing these actions may vary in weapons of different design. However, the following eight steps are always performed:

a. **Feeding.** This prepares the round for chambering by placing it into the receiver and into the path of the bolt. In its simplest form it is the insertion of a cartridge by hand. Feeding is usually accomplished by a spring in a magazine, a mechanism in the receiver, or a series of cams and pawls.

b. **Chambering.** This is the action required to place the new round in the chamber. Again, in its simplest form the shooter places the round into the chamber by hand. Chambering is usually accomplished when the face of the bolt pushes the round in the chamber.

c. **Locking.** Locking secures the bolt to the barrel, preventing the loss of gas pressure until after the bullet has left the muzzle. It is accomplished manually by the shooter or automatically by the mechanical action of various parts.

d. **Firing.** Firing is accomplished when the firing pin strikes the cartridge primer. The explosive composition in the primer is crushed and ignites the propellant in the cartridge case, forcing the bullet out of the barrel.

e. **Unlocking.** The bolt is unlocked so that it may move. Weapons using high pressure cartridges combine slow initial extraction with the unlocking of the bolt to overcome the effects of obturation. Slow initial extraction, which is a slight twisting and extraction of the cartridge before actual extraction occurs, takes place with the unlocking of the bolt. This prevents the head of the cartridge case from being torn off in the chamber before extraction.

f. **Extracting.** This is the removal of the empty cartridge case from the chamber. This step must be timed to prevent a blowback of gases into the shooter's face. The extractor may be a small hooked piece of metal in the bolt, which grips the extracting groove or rim of the cartridge case and pulls the empty case to the rear.

g. **Ejecting.** The removal of the expended cartridge case from the receiver is called ejection. This step can be accomplished by placing an ejector in the receiver. The case is carried to the rear by the extractor until it strikes the ejector. The ejector causes the case to be removed from the receiver. Another way of accomplishing this step is to use a spring-loaded ejector in the face of the bolt. When the case clears the chamber the spring expands throwing the case from the weapon.

h. **Cocking.** The positioning of the operating parts in readiness to fire another round is called cocking. The hammer or the firing pin is moved to the rear and held there until released.

3. **Types of Operating Systems.** The cycle of functioning is accomplished by one of four types of operating systems.

They are classified according to their source of power: manual, gas, blowback, and recoil operations.

a. Manual operation. In manual operation the source of power is the shooter. An example is the bolt action rifle. The shooter chambers the round by pushing the bolt forward. After the round is fired, he unlocks the bolt and pulls it to the rear. This causes extracting, ejecting and cocking. Bolt action rifles, revolvers, the M870 shotgun and the M203 Grenade Launcher are manually operated weapons.

b. Gas operation. In gas-operated weapons, a portion of the expanding gas is tapped off through a port in the barrel. The gas is vented into a gas cylinder or into a gas tube (See Figure 1). The gases moving rearward act against the operating parts, which causes unlocking, extracting, ejecting and cocking. A feed mechanism then feeds the new round. The forward motion of the bolt chambers the round and locks the breech.

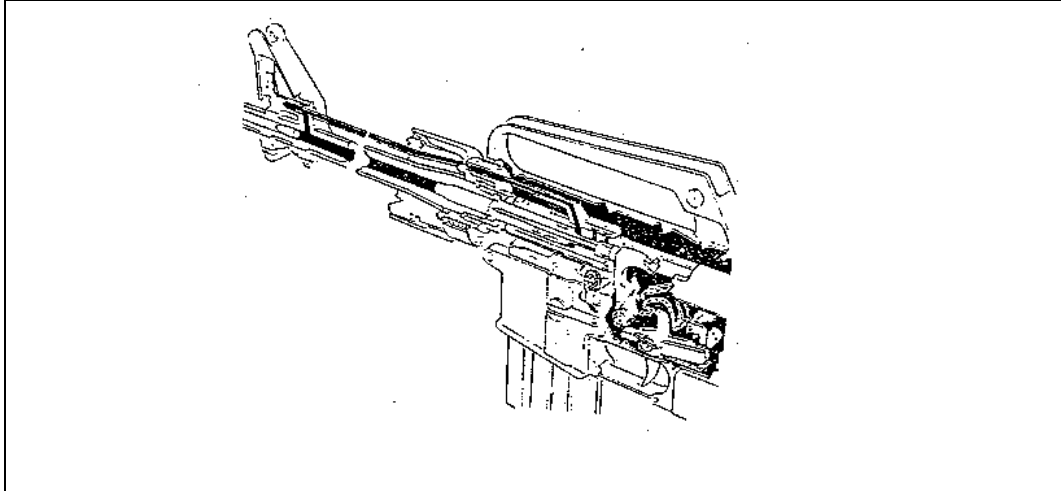


Figure 1. Gas operation of the M16 rifle.

c. Blowback operation. In a blowback operated weapon, the expanding gases act against the bolt. The pressure created by the burning gases is sufficient to drive the bolt to the rear. The weight of the bolt delays its forward motion, feeding, chambering and firing a new round. The MK19 40mm grenade launcher is a good example.

d. Recoil operation. This system uses the rearward thrust (recoil) of the weapon to drive the barrel, bolt and other operating parts to the rear. The bolt is locked to the barrel at the time of firing and remains locked, moving rearward with the barrel, until the bullet has left the muzzle. The bolt is then unlocked from the barrel and continues to the rear independently. Various methods are used to unlock the bolt and actuate the other operating parts. The .50 caliber machine gun and the M9 have this type of operation.

4. **Automatic and Semiautomatic Firing Systems.** A weapon that functions automatically utilizes gas, blowback or recoil operations. Automatic functioning does not mean that a weapon that functions automatically also fires automatically. For example, the 9mm, M9 pistol functions automatically but is capable of semiautomatic fire only.

a. Semiautomatic fire. A semiautomatic weapon is one in which the cycle of functioning is interrupted at the completion of each full cycle, just before firing. The functioning is performed by power from the cartridges without effort by the

shooter.

b. Automatic fire. This is the continuous operation of a weapon while the trigger is held to the rear. It ceases to operate when the trigger is released, all ammunition is expended, or a stoppage occurs. The M240G machine gun is an example of a weapon that is capable only of automatic fire.

c. Combination of automatic and semiautomatic fire. Some weapons are designed to fire automatically or semiautomatically. These weapons have a selector which permits the shooter to choose the type of fire desired.

d. Burst control. The M16A2 fires automatically for three rounds when the selector is on burst. Therefore, the M16A2 combines both automatic and semiautomatic fire. The M16A2 is limited to a maximum of three rounds in one burst of fire.

## 5. **Malfunctions and Stoppages**

a. Malfunction. A malfunction is a failure of a weapon to function satisfactorily. Malfunctions are classified as defects in a weapon that normally do not cause a break in the cycle of functioning. These may be discovered when operational tests are being performed.

b. Stoppage. A stoppage is any unintentional interruption in the cycle of functioning. If the weapon stops firing or an attempt to fire is made and the weapon does not fire, then a stoppage occurred. Stoppages are classified in accordance with the eight steps in the cycle of functioning. Stoppages are usually the result of worn parts or improper care of the weapon. A knowledge of functioning enables the shooter to correctly classify stoppages.

c. Immediate action. That action taken to rapidly reduce a stoppage without investigating its cause.

6. **Small Arms Ammunition.** Small arms ammunition consists of four basic components: projectile, propellant, primer and case (See figure 2). These components may vary in design depending on the purpose of the ammunition.

a. Projectile. The projectile (bullet) consists of a core (filler) and a relatively soft metal jacket that easily engages the rifling of a weapon. The filler may be composed of various combinations of metal and chemicals. The projectiles of most military ammunition, their use and their identifying markings are listed below:

(1) Ball. Used against personnel, light material targets and marksmanship training. It has a copper jacket and a lead core. The new 5.56mm ball projectile has a steel core penetrator (tip) and has a green tip.

(2) Armor-piercing. Used against light armored vehicles, protective shelters and personnel. The tip of the bullet is painted black. Upon contact the jacket peels away and the hard metal core penetrates the target.

(3) Tracer. Used in signaling, observation of fire and against personnel. Tracer ammunition has a limited incendiary capability. The tip of the bullet is painted orange, red-orange or red. The chemical tracer element enables the shooter to observe the trajectory of the round.

(4) Armor-piercing incendiary. It has a copper jacket, mixed filler and is silver-tipped. It is normally used against aircraft and flammable targets.

(5) Armor-piercing incendiary tracer. For use against armor and flammable targets. The tip is painted silver and red. It is available in .50 caliber, spaced every fifth round.

(6) Saboted light armor penetrator (SLAP). The SLAP round consists of a tungsten carbide penetrator with tracer element encased in a plastic sabot which is inserted into a standard brass casing. A very high muzzle velocity results because of the comparatively light weight of the projectile. This provides significant armor piercing capability over the standard ammunition. (Still under development, not yet in the inventory.)

b. Propellant. The propellant is a relatively slow burning powder. Most propellants have a nitrogenous base and are known as smokeless powders. Many propellants are made in the form of perforated grains. The perforations enable grains to burn at a uniform rate.

c. Primer. The primer is a soft metal cup containing an ignition charge and anvil. When the cup is dented by a sharp blow from the firing pin, the primer composition is crushed against the anvil. Flame shoots through the primer vent igniting the propellant.

d. Case. The case serves as a base or container for the other components of the cartridge. The head of the case contains an extracting groove so that the expended case may be withdrawn from the chamber.

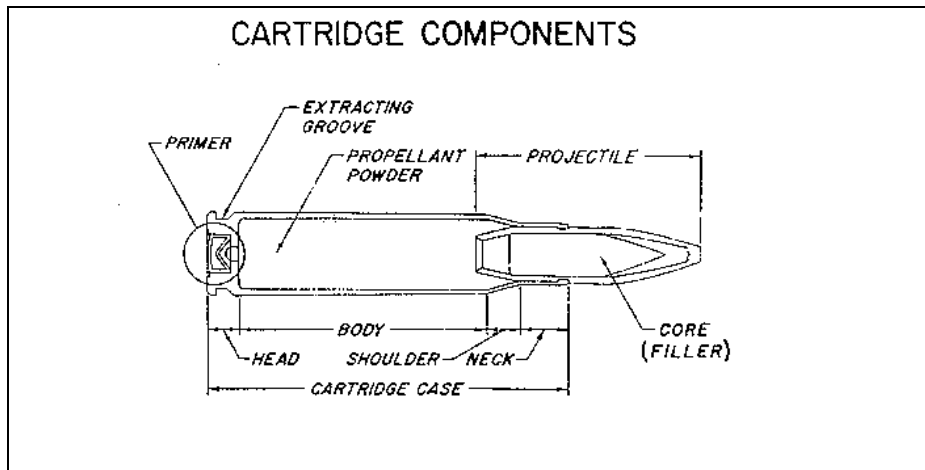


Figure 2. A typical round of small arms ammunition.

## 7. Weapons Handling

### a. The four safety rules

(1) Treat every weapon as if it were loaded. This rule is intended to prevent unintentional injury to personnel or damage to property from an individual handling or transferring possession of a weapon to another.

(a) Never trust your memory or make any assumptions about a weapon's safety status. Check your weapon whenever there is any doubt.

(b) Check your weapon for ammunition whenever it has been out of your possession.

(c) Never hand a weapon to anyone without clearing it. Clearing is a procedure for ensuring there is no ammunition in the weapon. Whenever you assume control of a weapon from someone, your first action is to clear it, even if you have witnessed its clearing.

(d) Never move in front of a weapon held by someone else.

(e) Never engage in or tolerate horseplay with or around weapons.

(2) Never point a weapon at anything you do not intend to shoot. This rule reinforces the importance of muzzle awareness.

(a) Always be aware of muzzle direction and your surroundings. This ensures you will not unintentionally point your weapon at anything other than an intended target.

(b) Be aware of the maximum range of your weapon. If you do not know what is beyond your

vision in any unprotected direction, do not point your weapon in that direction.

(c) Never allow the muzzle of your weapon to point at any part of your body.

(3) Keep your finger straight and off the trigger until you are ready to fire. This rule is intended to minimize the risk of firing the weapon accidentally.

(a) Never be guilty of a negligent discharge.

(b) A common reaction to a sudden shock or loss of balance while handling a weapon is an unintentional tightening of the grip. If your finger is off the trigger, you will eliminate the potential for firing a shot accidentally.

(4) Keep weapon on safe until you intend to fire. This rule enforces the use of the weapon's own safety feature.

(a) The SAFE position on the selector lever is a built-in feature that has only one function. That function is to prevent inadvertent firing of the rifle.

(b) When patrolling or walking it is possible for the trigger to be unintentionally depressed by objects (e.g., branches, wire, gear) encountered en route. Keeping the weapon on safe ensures the weapon will not fire if the trigger is accidentally engaged.

(c) Never trust anyone else regarding a weapon's safety status.

b. Weapons condition codes. A weapon's readiness/safety status is described by one of four conditions. The steps in the loading and unloading process take the weapon through four specific levels of readiness for live fire.

(1) Condition 1. To place a weapon in condition 1, a round must be in position to be fired and the safety must be on.

(2) Condition 2. To place the weapon in condition 2, a round must be in place to be fired, the weapon's action must be closed, and the hammer must be forward. (This condition only applies to weapons that have external hammers.)

(3) Condition 3. To place a weapon in condition 3, a source of ammunition is in position to be chambered, the chamber is empty, the bolt is closed and the weapon is on safe.

(4) Condition 4. To place a weapon in condition 4 all sources of ammunition are removed, the chamber is empty, the bolt is closed and the weapon is on safe.

c. Weapons commands

(1) "Load" is the command used to take a weapon from condition 4 to condition 3.

(2) "Make Ready" is the command used to take a weapon from condition 3 to condition 1.

(3) "Fire" is the command used to specify when Marines may engage targets.

(4) "Cease Fire" is the command used to specify when Marines must stop target engagement.

(5) "Unload" is the command used to take a weapon from any condition to condition 4.

(6) "Unload, Show Clear" is the command used to require that a second individual check the weapon to verify that no ammunition is present before the rifle is put into condition 4.

PART II: SERVICE RIFLE

1. **Operational Characteristics.** The M16A2 rifle is a 5.56mm, magazine-fed, gas operated, air-cooled, shoulder-fired weapon (Figure 3). The M16A2 is carried by all enlisted Marines whose duties do not preclude their firing it (for example, a machine gunner is armed with the 9mm, M-9 pistol). The M16A2 is also carried by Infantry Platoon Commanders.

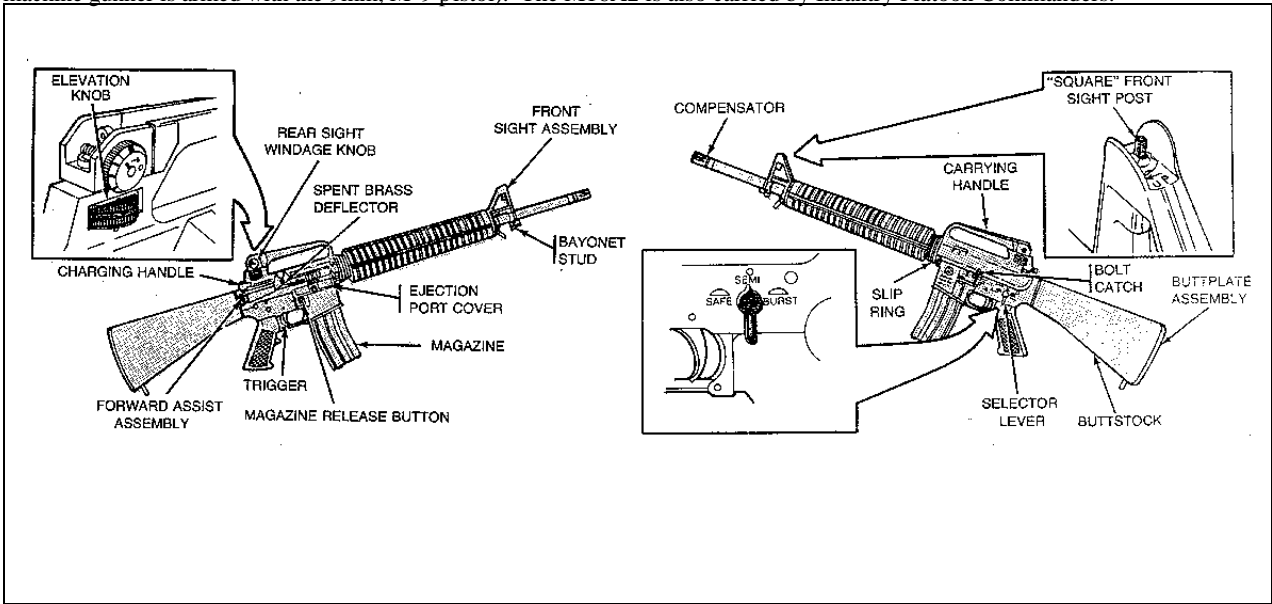


Figure 3. Nomenclature

2.	<b>General Data</b>	<u>                    kilograms                    </u>	<u>                    pounds                    </u>
a.	Firing weight w/loaded magazine (30 rds)	3.99	8.79
		<u>centimeters</u>	<u>inches</u>
b.	Length		
	(1) Rifle with bayonet knife, M7 114.00	44.87	
	(2) Rifle overall with muzzle compensator	100.6	39.62

**3. Operational Capabilities (M16A2)**

- a. Cyclic Rate of Fire 800 rds/min
- b. Average Rate of Fire 10-12 rds/min
- c. Sustained Rate of Fire 12-15 rds/min
- d. Maximum Range 3534m
- e. Maximum Effective Range 550m (point target)
- f. Maximum Effective Range 800m (area target)
- g. Muzzle Velocity 3,100 feet per second
- h. Chamber Pressure 52,000 psi

**4. Rates of Fire**

- a. Cyclic Rate of Fire--The rate at which a weapon can fire automatically.
- b. Average Rate of Fire--The maximum number of rounds the average rifleman can fire accurately in one minute.
- c. Sustained Rate of Fire--The actual rate of fire that a weapon can continue to deliver fire for an indefinite length of time without causing a malfunction or stoppage.

**5. Clearing the M16 Rifle.** The first consideration in handling any weapon is to ensure the weapon is clear. To clear the M16 rifle:

- a. Attempt to place the selector lever on SAFE. If the weapon is not cocked, the selector lever cannot be placed on SAFE. In either case go on to the next step.
- b. Remove the magazine.
- c. Lock the bolt carrier to the rear.
- d. Inspect the receiver and chamber, both visually and physically.
- e. Check the selector lever to ensure that it points toward SAFE.

**NOTE:** THE RIFLE IS CLEAR ONLY WHEN THERE IS NO ROUND IN THE CHAMBER, THE MAGAZINE IS OUT, BOLT CARRIER IS LOCKED TO THE REAR, THE SELECTOR LEVER IS IN THE "SAFE" POSITION.

**6. Disassembly and Assembly**

- a. Field stripping
  - (1) Ensure that weapon is clear.
  - (2) Let the bolt go home and keep selector lever on safe.
  - (3) Press the takedown pin and the pivot pin to the right and separate the upper and lower receivers.
  - (4) Remove charging handle and bolt carrier.
  - (5) Disassemble bolt carrier group, including the extractor.
  - (6) Remove buffer assembly.
  - (7) Remove handguards.
- b. Detailed disassembly. It is not authorized by anyone other than armorers.

c. Assembly. Reverse the order of disassembly.

- (1) Replace handguards.
- (2) Replace buffer assembly.
- (3) Reassemble the bolt carrier group.
- (4) Replace charging handle and bolt carrier.
- (5) Reassemble upper and lower receivers and reseal the pivot pin and take down pin to the left.

d. Function check. A function check of the rifle consists of checking the operation of the rifle while the selector lever is in each position; SAFE, SEMI, and BURST.

- (1) Pull charging handle to the rear and release. Place selector lever on SAFE. Pull trigger. Hammer should not fall.
- (2) Place selector lever on SEMI. Pull trigger and hold to the rear. Hammer should fall. Pull charging handle to the rear and release. Release trigger and pull to the rear again. Hammer should fall.
- (3) Place selector lever on BURST. Pull charging handle to the rear and release. Pull trigger and hold to the rear. Hammer should fall. Pull charging handle to the rear three times and release. Release trigger and pull again. Hammer should fall.

7. **Sight Adjustment**

a. Front sight. The front sight consists of a rotating, square front sight post with a spring-loaded detent.

(1) Calibration. The front sight is adjusted for calibration only when zeroing at 200 yards/meters on the Known Distance Course of Fire, when establishing a true battle sight zero at either 300 yards/meters, or during limited range, field expedient, 36 yard battle sight zeroing (M855 ammunition is unstable out to 27 yards (FMFM 0-8, pg 7-7)). Once this calibration is accomplished the front sight is never moved again.

(2) Elevation adjustment. To adjust the elevation on the front sight simply rotate the front sight post. Use a sharp instrument such as the tip of a round to depress the spring-loaded detent and rotate the front sight post. To move the strike of the round up, rotate the front sight post clockwise. To lower the strike of the round turn the front sight post counterclockwise. Turning the front sight post one click will move the strike of the round 1.375 (1.38) inches for every 100m of range or 1.25 (1.1/4) inches for every 100 yards of range.

b. Rear sight. The rear sight consists of two flip-type apertures, a windage adjustment knob and a rear sight elevation adjustment knob with scale.

(1) The short range (0-2) aperture. The short range aperture marked 0-2 is for use at ranges of 200m or less. The 0-2 aperture contains the largest aperture opening of the two apertures and thereby allows more light to pass through the openings to enter the aiming eye. The 0-2 aperture should only be used when engaging combat targets or engaging moving targets. The 0-2 aperture will not be used when firing for qualification at 200 yards over the Known Distance Course of Fire.

(2) The long range aperture. The long range aperture, which contains the smaller aperture opening, is used to engage combat targets at ranges of 200m or greater. This aperture is also used to engage targets at all ranges fired over the Known Distance (KD) Course of Fire.

(3) Windage adjustment. To adjust the rear sight for windage simply turn the windage knob located on the right side of the rear windage knob clockwise. Turning the windage knob one click will move the strike of the round 0.5 (1/2) inch of 1.27cm for every 100m of range and .448 (slightly less than 1/2) inch for every 100 yards of range.

(4) Elevation adjustment. To adjust the rear sight for elevation, turn the horizontal rear sight elevation knob located under the rear sight. Read the scale on the left side of the rear sight elevation knob to determine the range setting. The range setting of 8/3 may indicate a range setting of either 300m or 800m. If there is a large, noticeable gap (1.4 inch) between the rear sight base and the receiver when the 8/3 setting is on the elevation scale, then the rear sight is set for a range of 800m. If only a very small gap is visible, the sights are set for 300 meters of range. One click on the rear sight elevation adjustment knob will move the strike of the round approximately 1 inch (2.8 cm) for every 100m of range.



8. **Functioning.** The cycle of functioning consists of eight basic steps: feeding, chambering, locking, firing, unlocking, extracting, ejecting and cocking. More than one of these steps can take place at the same time. Functioning in the rifle may be either burst-controlled or semiautomatic through the use of the selector lever.

a. Semiautomatic fire

(1) Feeding. As the bolt carrier moves rearward and clears the top of the magazine, the follower and spring in the magazine push a new round up into the path of the bolt.

(2) Chambering. As the bolt carrier moves rearward, the head of the buffer assembly is struck and forced rearward. Expansion of the action spring sends the buffer assembly forward with enough force to drive the bolt carrier forward. As the bolt carrier moves forward, the face of the bolt strips a round from the top of the magazine and pushes it into the chamber.

(3) Locking. In the last half-inch of the forward movement, the bolt cam pin emerges from the guide channel in the upper receiver and moves along the cam track, rotating the bolt counterclockwise into the locked position. Locking is complete when the lugs on the bolt and barrel extension are aligned.

(4) Firing. As the shooter squeezes the trigger, it rotates on the trigger pin disengaging the nose of the trigger from the notch on the bottom on the hammer. The hammer is thrown forward by the action of the hammer spring. The hammer strikes the rear of the firing pin, driving the firing pin through the bolt into the primer of the round.

NOTE: When the primer ignites the powder, the action of the gas forces the projectile through the barrel. At the same time the gas moves through the barrel, passing the gas port located on the upper surface of the barrel (under the front sight assembly), a small portion of the gas passes through the gas port and into the gas tube. The gas tube directs the gas through the bolt carrier key into the cylinder between the bolt carrier, causing the bolt carrier to move rearward.

(5) Unlocking. As the bolt carrier moves to the rear, the bolt rotates clockwise until the locking lugs of the bolt are no longer aligned with the lugs in the barrel extension.

(6) Extracting. As the bolt carrier continues its rearward movement, the expended cartridge is withdrawn from the chamber by the extractor claw.

(7) Ejecting. The ejector is compressed into the face of the bolt. As the bolt carrier clears the ejection port, the empty cartridge is thrown out by the ejector and spring.

(8) Cocking. As the bolt carrier moves rearward it overrides the hammer forcing it down. The lower hook of the hammer is then engaged by the disconnecter. When the trigger is released the hammer slips from the disconnecter and is caught by the nose of the trigger preventing the hammer from going forward. Cocking is now complete.

These are the eight steps in the cycle of functioning for the M16A2 for semiautomatic fire. In firing the weapon automatically the same eight steps come into play. However, there are certain actions in the lower receiver that are different.

b. Burst control fire

(1) With the selector lever set in the BURST position, the rifle will fire 3-round bursts.

(2) As the trigger is squeezed, the cycle of functioning begins. The hammer is cocked as the bolt carrier recoils, but the center cam holds the disconnecter down preventing it from engaging the lower hammer hook.

(3) The automatic sear, the bottom of which is now moved forward, catches the upper hammer hook and holds it until the bolt carrier moves forward. As the bolt carrier moves forward the rear portion strikes the top of the sear, releasing the hammer and causing the rifle to fire.

(4) The rifle will fire a 3-round burst using the cycle of functioning described. On the fourth round the burst control cam on the hammer retention pin causes the secondary disconnecter to move upward and engage the lower hammer hook and thus interrupt the cycle of functioning.

(5) If the trigger is released the hammer moves forward and is caught by the nose of the trigger; this will end the burst-control automatic cycle until the trigger is again squeezed.

(6) All other portions of the cycle of functioning remain the same.

c. Action of the magazine. The cycle of functioning stops when the trigger is released or when the magazine is empty.

(1) As the last round is fired, the magazine follower pushes up on the bottom of the bolt catch forcing it into the path of the bolt. This holds the bolt carrier to the rear.

(2) To chamber a round, first press in on the upper portion of the bolt catch to release the bolt carrier. CAUTION: If a new magazine has been inserted and the bolt carrier goes forward, the weapon is charged and ready to fire.

9. **Stoppages and Immediate Action.** Immediate action for the M16A2 consists of the following steps:

- a. Stoppage. A stoppage is any unintentional interruption in the cycle of function.
- b. Immediate action. That action taken to rapidly reduce a stoppage without investigating its cause.

(1) Tap. Slap the bottom of the magazine to ensure it is fully seated into the weapon.

(2) Rack. Pull the charging handle to the rear and release it.

(3) Bang. Aim in on your target and attempt to shoot.

c. Remedial action. Remedial action is performed if immediate action fails to clear the interruption. During remedial action, Marines must investigate the cause of the interruption in order to return the weapon to a usable state. Remedial action consists of the following steps.

(1) Seek cover.

(2) Pull the charging handle to the rear.

(3) Observe the ejection port to see if a cartridge case is ejected.

(4) Release the charging handle to chamber a new round.

(5) Tap the forward assist to ensure that the bolt is fully forward and locked.

(6) Shoot (attempt to fire weapon).

**NOTE:** If nothing is ejected from the ejection port, a failure to extract or feed has occurred. Inspect the chamber to ensure that is clear. If the chamber is empty, change magazine and attempt to fire. SPORTS is an acronym that may help you to remember the six steps of remedial action; Seek, Pull, Observe, Release, Tap and Shoot.

10. **Care and Cleaning**

a. General. Normal care and cleaning will result in proper functioning of all parts of the weapon. Improper maintenance causes stoppages and malfunctions. Only "issue" type cleaning materials should be used. These cleaning materials are carried by the rifleman in the compartment provided in the stock of the weapon. Do not use any abrasive material to clean the rifle. CLP is the only authorized lubricant for the M16A2 Rifle.

- b. Cleaning and lubrication of the barrel

(1) Attach a bore brush to the cleaning rod, dip it in CLP, and brush the bore thoroughly. Brush from the chamber to the muzzle using straight-through strokes. Push the brush through the bore until it extends beyond the muzzle compensator. Continue this process until the bore is free of carbon and fouling. (Never reverse the direction of the brush while in the bore). Remove the brush from the cleaning rod and dry the bore with clean M16 patches. (M14 patches must be cut into four equal size patches). DO NOT attempt to retract the patch until it has been pushed all the way out of the muzzle compensator. CAUTION: The cleaning rod is to be supported by hand, one section at a time, to prevent flexing and damage to the bore.

(2) Attach the chamber-cleaning brush to a section of the cleaning rod. Dip it in CLP, and insert it in the chamber. Use five or six plunging strokes and three or four rotations (360 degrees) of the brush to clean the chamber. Then remove the brush and dry the chamber thoroughly with clean patches.

(3) Clean the locking lugs in the barrel extension, using a small bristle brush dipped in CLP to remove all carbon deposits. A tooth brush is good for this operation.

(4) Clean the protruding exterior of the gas tube in the receiver with the bore brush attached to a section of the cleaning rod. The top of the gas tube can be cleaned by inserting the rod and brush in the back of the receiver. The sides and

bottom of the gas tube can be cleaned from the bottom of the receiver.

(5) After cleaning, lubricate the bore and locking lugs in the barrel extension by applying a light coat of CLP to prevent corrosion and pitting. If the hand guards have been removed, rub a light coat of CLP on the surface of the barrel enclosed by the handguards.

(6) Place one or two drops of CLP on the front sight post and exercise it.

c. Cleaning and lubrication of the bolt carrier group

(1) Remove the bolt carrier group from the upper receiver and disassemble it. Thoroughly clean all parts with a patch or bristle brush dipped in CLP.

(2) Clean the locking lugs of the bolt, using a small bristle brush and CLP. Ensure that all carbon and metal filings are removed; then wipe it clean with dry patches and lubricate lightly.

(3) Use a small bristle brush dipped in CLP to scrub the extractor to remove carbon and metal filings. Also clean the firing pin recess and the firing pin.

(4) When dry and before final assembly, apply a coat of CLP to the bolt body, rings and carrier key. When bolt carrier group is reassembled apply a liberal amount of CLP to all exterior surfaces with particular emphasis to the friction points (i.e., rails and cam area). PUT ONE DROP OF CLP IN THE CAM PIN TRACK AND TWO DROPS IN THE GAS PORTS.

d. Cleaning and lubrication of the upper receiver

(1) Clean the upper receiver until free of powder fouling with CLP.

(2) After cleaning, coat the interior surfaces of the upper receiver with CLP. Pay particular attention to shiny surfaces which indicate areas of friction.

e. Cleaning and lubrication of the lower receiver group

(1) Wipe any particles of dirt from the trigger mechanism with a clean patch or brush and place a drop of CLP on each of the pins for lubrication.

(2) Components of the lower receiver group can be cleaned with CLP and a brush. Use a scrubbing action to remove all carbon residue and foreign material and then drain the CLP from lower receiver and wipe dry.

f. Cleaning and lubrication of the magazine

(1) Disassemble the magazine, being careful not to stretch or bend the magazine spring. Scrub the inside of the magazine with a bristle brush dipped in CLP and then wipe it dry. CAUTION: The magazine is made of aluminum and does not need any lubrication.

(2) Scrub the spring clean of any foreign material using a bristle brush dipped in CLP. Wipe dry and apply a very light coat of CLP to the spring.

## 11. **Inspection**

a. Bore and chamber

(1) A dirty chamber can cause failure to chamber and extract. When checking the chamber, make sure it's free of carbon, grit and pitting.

(2) Check the barrel in natural light if possible. It should be free of powder residue, carbon buildup, and all other foreign matter. Use a barrel reflector, if one is available, and inspect the bore from each end if possible - looking halfway down the barrel each time. Give particular attention to the first two inches of the bore from the breech and muzzle. Look for any dark spots that would indicate pitting. Pitting is the gradual eating away of the barrel due to corrosion. Slight pitting appears as a dark roughening of the bore surface and does not make the bore unserviceable. Pits become serious and make a bore unserviceable when they have eaten across a land or a groove, or when the pits cover more than 1/4 of the bore area. Pits in the chamber make the barrel unserviceable if they prevent proper chambering and extracting.

(3) On heavily used weapons the bore area near the chamber may appear slightly dark and rough. This is

due to gas erosion, which is the normal wear caused by the high gas temperature and pressure near the chamber. It is normally not serious. However, gas erosion in a weapon can lead to pitting if extra care is not given the weapon. The same applies to any scratches made by rough use of the cleaning rod. Scratches must be watched and cared for or the scratched area may pit.

(4) Also look for bulges, cracks, and ruptures in the barrel which are usually caused by firing a weapon with an obstruction in the bore. A bulge will usually appear as a shadowy depression or dark ring around the inside circumference of the bore. A bulge may also appear on the outside surface of the barrel. Defects such as bulges, cracks and ruptures make a barrel unserviceable.

b. Gas system. The gas system on a weapon must be cared for or the weapon won't function. On the M16A2 inspect the gas port on the bolt carrier. Also inspect around the gas tube extension to make sure it mates with the bolt carrier gas port (carrier key) properly.

c. Receiver

(1) The locking recesses should be clean and the operating rod or charging handle on the receiver should move easily without binding. When inspecting the bolt, pay particular attention to the face of the bolt and the locking lugs. The extractor and ejector should be free from carbon and dirt and should have good spring tension. Clean the bolt with a brush dipped in CLP, wipe clean and cover with a light coat of CLP. Put a generous coat of CLP on the locking lugs and parts subject to heavy metal-to-metal friction.

(2) When inspecting the firing mechanism in the lower receiver group ensure that the safety functions properly.

d. Magazine. In magazine-fed weapons, faulty magazines are one of the principal causes of stoppages and are frequently overlooked. Magazines should be kept as clean as possible. Inspect the magazine follower and spring for proper functioning.

e. Sights. The sights on a weapon should be checked for proper functioning of any moving parts, and for broken or bent surfaces. Of course, ensure that the sights and the rest of the weapon are free from any sign of corrosion.

## 12. Weapons Conditions

a. Condition 1. Magazine inserted, round in chamber, bolt forward, weapon on safe, and ejection port cover closed.

b. Condition 2. There is no condition 2 for the M16A2.

c. Condition 3. Magazine inserted, chamber empty, bolt forward, weapon on safe, and ejection port cover closed.

d. Condition 4 Magazine removed, chamber empty, bolt forward, weapon on safe, and ejection port cover closed.

## 13. Weapons Commands

"LOAD"	Takes the weapon from condition 4 to condition 3
"MAKE READY"	Takes the weapon from condition 3 to condition 1
"FIRE"	Engage target(s)
"CEASE FIRE"	Cease target engagement
"UNLOAD"	Takes the weapon from any condition to condition 4
"UNLOAD, SHOW CLEAR"	Requires a second individual to inspect the weapon before the weapon is placed into condition 4

a. Execute "LOAD" taking the weapon from condition 4 to condition 3.

(1) Ensure the weapon is in condition 4.

(2) Withdraw the magazine from the magazine pouch.

(3) Ensure the magazine is filled.

(4) Fully insert magazine in the magazine well.

(5) Tug downward on the magazine to ensure that it is held into the rifle by the magazine catch.

- (6) Close the magazine pouch.
- (7) Close the ejection port cover.
- b. Execute "MAKE READY," taking the weapon from condition 3 to condition 1.
  - (1) Pull the charging handle fully to the rear and release.
  - (2) Check sights.
  - (3) Close ejection port cover (if time and situation permit).

NOTE: To ensure that ammunition has been chambered, pull the charging handle slightly to the rear and visually inspect the chamber. (You may tap the forward assist to ensure the bolt closes after inspecting the chamber.)

CAUTION: Pulling the charging handle too far to the rear when inspecting the chamber may cause a double feed or ejection of one round of ammunition.

- c. Execute "FIRE"
  - (1) Take weapon off safe, and place finger on trigger.
  - (2) Engage target.
- d. Cease fire. On the command "Cease Fire," perform the following:
  - (1) Place your trigger finger straight along the receiver.
  - (2) Place the weapon on safe.
- e. Execute "UNLOAD," taking the weapon from condition 1 to condition 4.
  - (1) Attempt to put the weapon on SAFE.
  - (2) Remove the magazine from the weapons and retain it on your person.
  - (3) Rotate weapon with ejection port down.
  - (4) Pull the bolt to the rear.
  - (5) Ensure the chamber is empty and no ammunition is present.
  - (6) Release the charging handle and observe bolt going forward on any empty chamber.

NOTE: Put the weapon on SAFE now if it would not go on SAFE earlier.

- (7) Close ejection port cover.
- (8) Check sights.
- (9) Recover, inspect and insert any ejected ammunition into magazine (Omit this step at night).
- (10) Return magazine to magazine pouch and close pouch.
- f. Execute "UNLOAD, SHOW CLEAR," taking the weapon from any condition to condition 4.
  - (1) Attempt to put weapon on SAFE.
  - (2) Remove the magazine from weapon and retain it on your person.
  - (3) Rotate weapon until ejection port is down.

- (4) Lock the bolt to the rear.
- (5) Ensure chamber is empty and no ammunition is present.

NOTE: Put weapon on SAFE now if it would not go on SAFE earlier.

- (6) Have a second party inspect weapon to ensure no ammunition is present.
- (7) Release bolt catch and observe bolt going forward on an empty chamber.
- (8) Close ejection port cover.
- (9) Check sights.
- (10) Recover, inspect and insert any ejected ammunition into magazine (Omit this step at night).
- (11) Return magazine to magazine pouch and close pouch.

14. **Safety.** Safety is absolutely essential. Safety measures should be practiced until their application becomes habitual.

- a. Normal situations. During normal situation, weapons should be in condition 4 (see paragraph 12).
- b. Unusual circumstances. In situations when combat or when contact with the enemy appears imminent, weapons will be at condition 3 or 1 depending on the tactical judgement of the unit leader or line NCO if on a firing range.
  - (1) Selector lever should be pointed toward SAFE.
  - (2) Rifle should be pointed in the direction of the enemy, never toward friendly personnel.